



Editorial

The impact of COVID-19 on global tuberculosis control

March 24 is World Tuberculosis (TB) Day. In many countries, events marking World TB Day in 2020 were cancelled as national lockdowns began. This was not due to TB, but the ‘other pandemic’ and the year will be remembered as one where the virus SARS-CoV-2 and its disease COVID-19 dominated global health and disrupted national economies. Its direct effect has been felt in every country; its secondary impact has played out on other global diseases such as TB.

The United Nations Secretary General’s 2020 progress report on TB¹ recognized the potential for a loss of focus on the persisting crisis of TB and included as one of the 10 priority recommendations for actions needed to accelerate progress towards global TB targets, ‘to ensure that TB prevention and care are safeguarded in the context of COVID-19 and other emerging threats’. This was reinforced in the WHO Global TB Report 2020².

These international political statements are important, but for genuine impact, these need to be enacted at regional, national and sub-national levels. This is vital given that the global TB targets set within the UN Sustainable Development Goals and the WHO End TB Strategy were not being met before the disruption brought about by COVID-19² and are now therefore, likely to be even further from their intended trajectory. Here, we discuss the short- and long-term impact of COVID-19 on TB patients and services, using examples and information from around the world, with a focus on India.

The immediate effect of COVID-19 was a significant disruption to global health care. This included the redeployment of staff and reallocation of resource from TB to other/COVID-support services and a loss of staff due to sickness/quarantining. Further, a reduction in public transportation and the introduction of movement restrictions made it harder for staff to

travel to work³. The staff shortages affected preventive therapy programmes including BCG vaccination, for example, a million fewer Indian children than usual receiving BCG in April 2020⁴. It also became increasingly difficult for staff to reach TB patients on treatment. This was compounded by disruption to supply chains, meaning that medication and diagnostic reagents began to run out.

COVID-19 and TB symptoms are similar⁵; poor levels of public knowledge about COVID-19 combined with stigma (for both diseases)⁶ encouraged symptomatic people to isolate from communities yet continue to mix with close friends and family. New cases of TB were often too frightened to attend healthcare services (which they perceived as places where they could catch COVID-19)⁶. This was not helped by the precautionary messages that healthcare facilities put out, discouraging people from attending without a good cause, and so avoid healthcare-related SARS-CoV-2 transmission⁷.

The net result of symptomatic TB patients not using healthcare services, which themselves were severely stretched, was a global fall in the number of reported TB notifications. India, which accounts for over one-quarter of the world’s TB cases at an estimated 2.64 million in 2019, reported a 25 per cent reduction in notifications for the first half of 2020 compared to the same period in 2019².

Much of the contribution to COVID-19 by TB and other services was informed by infection prevention and control considerations⁸. This included the prompt identification and management of possible infectious cases of COVID-19 through the use of robust clinical diagnostic criteria and the strengthening of infection prevention and control for airborne, droplet and contact transmission (both for patients and staff) and the avoidance of unnecessary visits to health facilities.

The latter utilized where possible, remote phone consultations and digital technology, which required an upscaling of relevant platforms. This had the potential to promote improved data collection using simpler methodologies, though also the risk of information failure. The private sector was encouraged to work with public health services.

Specific patient groups such as older people, those with diabetes and the malnourished were recognized as being at particular risk during the pandemic, and extra support was provided to pregnant and breastfeeding women and children, people with drug-resistant TB and those with HIV/TB co-infection. Effort was made in some settings to ensure that migrants and disadvantaged groups were reached and also supported⁹.

Public statements emphasized the need to ensure that funding continued for TB services, and that ongoing TB research programmes were continued. We will have more of an idea how this plays out over the next 1-2 years, though there are already reports of significant disruption⁶.

The not-for-profit private sector and non-governmental organizations supported TB services in a variety of ways¹⁰. This included the production of guidance documentation (Mercy Corps, Pakistan, <https://www.mercycorps.org/sites/default/files/2021-01/Addressing-the-Second-Order-Impacts-of-COVID-19-2021.pdf>) and the detection of TB and COVID-19 using mobile facilities (BRAC, Bangladesh, <https://www.who.int/bangladesh/news/detail/26-11-2020-protecting-tb-progresses-in-cox-s-bazar-ensuring-that-tb-prevention-care-face-no-setbacks-during-covid-19-pandemic>; KNCV, Nigeria, <https://www.kncvtbc.org/en/2020/10/02/wow-trucks-revolutionary-tb-and-covid-19-testing-in-nigeria/>), as well as artificial Intelligence methodology (Qure-ai, India, <https://qure.ai/news.html>). Diagnostics and treatment were supported using e-Pharmacies (SHOPS Plus, India, <https://www.shopsplusproject.org/article/using-e-pharmacy-model-deliver-tb-medication-patients-during-covid-19-pandemic>) and home-delivery approaches (Innovators in Health, India; MSF, India, <https://www.msfindia.in/covid-19-in-india-tackling-tuberculosis-in-the-middle-of-coronavirus-pandemic/>). Private general practitioners' clinics also helped distribute medication (Community Health Solutions, Pakistan, https://twitter.com/chs_health_care?lang=en). In several countries, telephone-monitoring (Innovators in Health, India,

<https://www.innovatorsinhealth.org/tuberculosis.html>) and digital technology focused on maintaining treatment adherence (IRD, South Africa, <https://www.usaid.gov/global-health/health-areas/tuberculosis/resources/news-and-updates/global-accelerator-end-tb/stories/ird-south-africa-access-tb-services>; UnitAid ASCENT and KNCV, Philippines, <https://www.digitaladherence.org/>), though their effectiveness has not been evaluated.

Financial support and solutions for TB services included the COVID-19 Response Mechanism (from the Global Fund to Fight AIDS, TB and Malaria, https://www.theglobalfund.org/en/covid-19-response-mechanism/#:~:text=Known%20as%20C19RM%2C%20the%20COVID,in%20health%20and%20community%20systems.)) and cash payments for patients (Innovators in Health, India, <https://www.innovatorsinhealth.org/tuberculosis.html>). Advocacy for restoration of the following year's TB budget was also reported (PhilCAT, Philippines, <https://philcat.org/>).

All of these activities were crucial as modelling studies suggested that under-notification of TB in 2020 had a profound impact on the number of TB-related deaths. For example, if COVID-19 led to a decrease in reported global TB cases of 25-50 per cent for three months during 2020, there would be an estimated extra 200,000-400,000 future TB deaths worldwide² due to TB patients not accessing health services to get appropriate care. Further modelling indicated that between 2020 and 2025, COVID-19 may cause an additional 6.3 million cases of TB globally. The (now optimistic) projection of starting with a single three months of lockdown could lead to an extra 1.4 million deaths¹¹. Our work suggested that over the same timeframe, India will have around 100,000 excess deaths if there were a moderate reduction in transmission events in 2020 due to lockdown and a 50 per cent reduction in health services for six months¹². We now know that a single lockdown was not adequate, and so the impact will likely be greater than described and will most affect the vulnerable and disadvantaged at highest risk of TB¹³.

Driven by the collapse of many countries' economies, there will be an increase in undernutrition in the population, a major potential issue for TB in India¹⁴, continuing disruption of health services and sustained difficulty in diagnosing and treating TB patients. Countries whose battered economies are struggling to

reset themselves will be a bad place for people with TB; the catastrophic costs of TB (defined as the direct and indirect total costs due to TB exceeding 20% of annual household income)¹⁵ will rise for them and their families.

Although SARS-CoV-2 vaccines appear to offer considerable promise, the issues of COVID-19 are likely to have ongoing negative effects with unexpected twists for several years. A recent example is the identification of highly transmissible SARS-CoV-2 strains that appear to have no reduction in pathogenicity, with the latest evidence suggesting that some do and some do not reduce current vaccine efficacy¹⁶.

Getting global TB control back on track

Against this background, how can we ensure that TB services rebuild as needed, in particular when there are so many competing demands on health and economic resource? The answer lies in political will and leadership. The WHO Multisectoral Accountability Framework TB to Accelerate Progress to end TB by 2030 (MAF-TB) was initiated at the first WHO Global Ministerial Conference on Ending TB (November 2017). Over the following two years, including discussion at the 71st World Health Assembly (May 2018) and the UN General Assembly High-Level Meeting on the fight against TB (September 2018), the final document was developed (with involvement from WHO Member States, and partners, including civil society) and released in May 2019¹⁷. MAF-TB calls for multisectoral engagement and accountability at global, regional and national (including local) levels. It is hoped that the MAF-TB has enough weight and global recognition for Member States to continue to support and engage with its aims, and not avoid the costs associated with TB service re-development. In high TB burden settings, the short-term gain of failing to honour the pledges made will be more than offset by the longer negative impact of uncontrolled TB. Political support for a further MAF-TB summit addressing the issue of COVID-19-related disruption on TB control, and what to do about it, would help retain international focus.

What can TB services and researchers do that will complement and enhance the desired political will encouraged by the MAF-TB? We suggest that they recognize their considerable value to patients and communities, and do what they do well; namely, maintain disease prevention and management services (including testing and triaging for COVID-19), whilst

learning from COVID-19 by advocating the routine use of masks by staff and patients to prevent infection transmission.

Public health services need to connect community members with TB health resources that can be adapted to local circumstances. Engagement with organizations trusted by the community will enable the public to receive clear messages about TB symptoms, when and how to seek help and the availability of free treatment that needs to be taken as a full course and not discontinued early for maximal impact. This also requires a consistent supply of medication. Measures such as the isolation of symptomatic TB patients, when possible, to reduce infection transmission within households should be promoted through community education. The same applies to household contact management, which is likely to be starting from a very low base across the world due to its near-abandonment in 2020, though is now even more important given the increased risk of transmission during COVID-19 lockdown.

New and innovative models of TB care need to be evaluated (including through the collection of operational data). Rapid molecular diagnostics (in place of older, less sensitive methods) as well as tele-health options for patients and carers to improve access need to be expanded and also evaluated. Without evidence of benefits or harms of these different service adaptations, it will be difficult to make recommendations to healthcare planners going forward.

There are also synergies for TB and other healthcare services, such as the importance of ensuring that poverty and malnutrition are managed (for example, by cash transfer programmes and nutritional support). We also must understand how we can make TB control services less vulnerable to future external threats, in particular, those such as COVID-19 which require a rapid response. This again has value beyond TB as the people most affected are those at greatest risk of other diseases.

Through all of this, there is a need to support TB services' vital staff resource, who may have encountered both professional and personal loss themselves over this time. This could include ensuring that healthcare workers receive prioritized SARS-CoV-2 vaccination¹⁸.

In conclusion, the COVID-19 pandemic has changed global society. We should take this opportunity to work together to end the old scourge of TB, when providing hope for a better future where the ravages of emergent diseases can be avoided.

Conflicts of Interest: None.

**Marc Lipman^{1,2,*}, C. Finn McQuaid³,
Ibrahim Abubakar⁶, Mishal Khan⁴,
Katharina Kranzer^{5,8,9}, Timothy D. McHugh⁷,
Chandrasekaran Padmapriyadarsini¹¹,
Molebogeng X. Rangaka⁶ & Neil Stoker⁷**

¹UCL Respiratory, Division of Medicine, Royal Free Campus University College London, ²Respiratory Medicine Royal Free London NHS Foundation Trust, ³Department of Infectious Disease Epidemiology, TB Modelling Group, TB Centre & Centre for Mathematical Modelling of Infectious Diseases, Faculty of Epidemiology & Population Health, ⁴TB Centre & Faculty of Public Health & Policy, ⁵Department of Clinical Research, Faculty of Infectious & Tropical Diseases, London School of Hygiene & Tropical Medicine, ⁶Institute for Global Health, University College London, ⁷Department of Medical Microbiology, Division of Infection & Immunity, University College London Centre for Clinical Microbiology, Royal Free Hospital Campus, UK, ⁸Biomedical Research & Training Institute, Harare, Zimbabwe, ⁹Division of Infectious & Tropical Medicine, Medical Centre of the University of Munich, Munich, Germany, ¹⁰School of Public Health, & CIDRI-AFRICA, University of Cape Town, Cape Town, South Africa & ¹¹ICMR-National Institute for Research in Tuberculosis, Chennai 600 100, Tamil Nadu, India

*For correspondence:
marclipman@nhs.net

References

- United Nations. *Progress towards the achievement of global tuberculosis targets and implementation of the political declaration of the high-level meeting of the General Assembly on the fight against tuberculosis: report of the Secretary-General*. Available from: <https://mailchi.mp/who/un-secretary-general-outlines-priority-recommendations?e=5b995e9d69>, accessed on January 27, 2021.
- World Health Organization. *Global tuberculosis report 2020*. Available from: <https://www.who.int/publications/item/9789240013131>, accessed on January 27, 2021.
- Khan MS, Rego S, Rajal JB, Bond V, Fatima RK, Isani AK, *et al*. Mitigating the impact of COVID-19 on tuberculosis and HIV services: A cross-sectional survey of 669 health professionals in 64 low and middle-income countries. *medRxiv* 2020. doi: <https://doi.org/10.1101/2020.10.08.20207969>.
- India Spend. *COVID-19 disrupted India's routine health services*. Available from: <https://www.indiaspend.com/covid-19-disrupted-indias-routine-health-services/>, accessed on January 27, 2020.
- Udwadia ZF, Vora A, Tripathi AR, Malu KN, Lange C, Sara Raju R. COVID-19 -Tuberculosis interactions: When dark forces collide. *Indian J Tuberc* 2020; *67* : S155-62.
- Civil Society Report on TB and COVID. *The impact of COVID-19 on the TB epidemic: A community perspective*. Available from: http://www.stoptb.org/assets/documents/resources/publications/acsm/Civil%20Society%20Report%20on%20TB%20and%20COVID.pdf?fbclid=IwAR3SOY4kyBs5a_35HleUhcwvRIWspePA4vVHESqcQxio7G4irivJ90cSU8k, accessed on January 27, 2021.
- Shrinivasan R, Rane S, Pai M. India's syndemic of tuberculosis and COVID-19. *BMJ Glob Health* 2020; *5* : e003979
- Meneguim AC, Rebello L, Das M, Ravi S, Mathur T, Mankar S, *et al*. Adapting TB services during the COVID-19 pandemic in Mumbai, India. *Int J Tuberc Lung Dis* 2020; *24* : 1119-21.
- The Union. *Statement on tuberculosis in migrants during the COVID-19 pandemic migration across the globe*. Available from: https://theunion.org/sites/default/files/2020-12/TB_Migr_COVID_Statement_November2020.pdf, accessed on April 12, 2021.
- TB PPM Learning Network. Available from: <https://www.tbppm.org>, accessed on January 27, 2021.
- Cilloni L, Fu H, Vesga JF, Dowdy D, Pretorius C, Ahmedov S, *et al*. The potential impact of the COVID-19 pandemic on the tuberculosis epidemic a modelling analysis. *E Clinical Medicine* 2020; *28* : 100603.
- McQuaid CF, McCreesh N, Read JM, Sumner T, CMMID COVID-19 Working Group, Houben RMGJ, *et al*. The potential impact of COVID-19-related disruption on tuberculosis burden. *Eur Respir J* 2020; *56* : 2001718
- Togun T, Kampmann B, Stoker NG, Lipman M. Anticipating the impact of the COVID-19 pandemic on TB patients and TB control programmes. *Ann Clin Microbiol Antimicrob* 2020; *19* : 21.
- Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans TG. Protecting households from catastrophic health spending. *Health Affairs* 2007; *26* : 972-83.
- Bhargava A, Shewade HD. The potential impact of the COVID-19 response related lockdown on TB incidence and mortality in India. *Indian J Tuberc* 2020; *67* : S139-46.
- Abu-Raddad LJ, Chemaitelly H, Butt AA, National Study Group for COVID-19 Vaccination. Effectiveness of the BNT162b2 Covid-19 Vaccine against the B.1.1.7 and B.1.351 Variants. *New England J Med* 2021; *385* : 187-9.

17. World Health Organization. *Multisectoral accountability framework to accelerate progress to end tuberculosis by 2030*. Available from: https://www.who.int/tb/WHO_Multisectoral_Framework_web.pdf?ua=1, accessed on January 27, 2021.
18. Centers for Disease Control and Prevention. *What we can do to promote health equity*. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/what-we-can-do.html>, accessed on January 27, 2021.